REMARKS

A Petition for Extension of Time is being concurrently filed with this response.

Applicants respectfully request the Examiner to reconsider the present application in view of the following remarks.

Status of the Claims

Claims 1-19 are pending in the present application. No claims are being amended, added or canceled. Thus, a listing of the claims is not needed.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims

Issues under 35 U.S.C. § 103(a)

The Examiner has maintained the rejection of all pending claims under 35 U.S.C. § 103(a) as being unpatentable over **Nobuo *et al.*** (JP 2002-003478; machine translation provided by Examiner) and **Swatloski *et al.*** (WO 03/029329) in view of Brandt *et al.*, *Ullmann's Encyclopedia of Chemical Technology*, Vol. 2, pp. 221-234 (2001) (hereinafter "**Brandt (*Ullmann's Encyclopedia*)**").

Nobuo *et al.* Has Been Improperly Combined with Swatloski *et al.* and Brandt (*Ullmann's Encyclopedia*)

The present invention is directed to a method for preparing a cellulose ether comprising mixing cellulose with an ionic liquid solvent to dissolve the cellulose, and then treating the

dissolved cellulose with an etherifying agent in the presence of an inorganic base to form a cellulose ether, and subsequently separating the cellulose ether from the solution. In the present invention, both the dissolution and the etherification are carried out in the absence of an organic base and in the substantial absence of water.

In the previous Amendment dated April 4, 2008 (at pages 9-13), Applicants argued the features of the present invention and the problems with the cited references. At least the following points were previously submitted:

- Etherification is more difficult to conduct versus esterification, wherein esterification does not even require a catalyst for the reaction to proceed;
- One of ordinary skill in the art would understand that the Nobuo *et al.* reference is directed to esterification (not etherification) and does not disclose cellulose, microwave irradiation and the modification of cellulose;
- The Swatloski *et al.* reference also does not disclose etherifying cellulose as well as separating cellulose ether from the reaction mixture;
- One of ordinary skill in the art understands etherification requires a base catalyst, leading to problems in the art including degradation of natural polymers like cellulose;
- Thermal treatment (>170°C) also degrades cellulose;
- Brandt (*Ullmann's Encyclopedia*) is thus inconsistent and cannot be properly combined with Nobuo *et al.* and Swatloski *et al.*; and
- The present invention solves problems of the prior art and is not a matter of optimization given the problems in the prior art.

Despite the problems with the cited prior art references, the Examiner has maintained this rejection as stated in the Final Office Action at pages 2-5. Specifically, the Examiner considers Brandt (*Ullmann's Encyclopedia*) as disclosing the appropriate conditions for etherification of cellulose (e.g., a base catalyst; etherifying agents), and thus this disclosure is combinable with

that of Nobuo *et al.* (ionic liquids; water sensitive reagents) and Swatloski *et al.* (microwave irradiation; modification of cellulose). Applicants respectfully traverse for the reasons of record and for the reasons below.

In the outstanding Office Action, the Examiner's main argument appears to be that the disclosure of Brandt (*Ullmann's Encyclopedia*) is combinable with Nobuo *et al.* and Swatloski *et al.*, with reference to the paragraph bridging pages 18-19 of Swatloski *et al.* (see Office Action at, e.g., page 3, third full paragraph). The cited part of pages 18-19 of Swatloski *et al.* discloses: "Cellulose can be dissolved for derivatization and for analysis . . .". An additional passage dealing with derivatization is stated in the paragraph starting on page 8, line 6 of Swatloski *et al.*, which states: ". . . A contemplated solution can be used as is to carry out further reactions on the cellulose such as acylation to form cellulose acetate or butyrate, or for regeneration." In this regard, the Examiner argues that Swatloski *et al.* teach separation of derivatized cellulose (Office Action at, e.g., page 3, lines 14-15). Applicants cannot find support for such an assertion in Swatloski *et al.* In fact, Swatloski *et al.* disclose separation of regenerated cellulose, but that disclosure does not relate to derivatized cellulose (see page 8, last paragraph of the reference). Thus, Applicants respectfully traverse the cited combination of references.

Furthermore, although Swatloski *et al.* suggest acylation of dissolved cellulose, the disclosure is non-enabling as such a reaction is not exemplified for one of ordinary skill in the art to utilize. Applicant notes that the cited modification/combination of a reference(s) must be enabling such that one of ordinary skill in the art can make the claimed invention. *See In re Payne*, 606 F.2d 303, 314, 203 USPQ 245, 255 (CCPA 1979); *see also Beckman Instruments Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989). Here,

Swatloski *et al.* do not teach the acylation should be carried out. In this regard, should for example an organic or inorganic catalyst be used, or no catalyst should be used at all? Thus, the esterification of Swatloski *et al.* is at best very speculative.

Additionally, and more importantly, Swatloski *et al.* are totally silent in respect of applying the method on etherification of cellulose that in view of process techniques is more difficult to carry out than an esterification. Though Applicants realize that the Examiner has cited two other references, Applicants note that the skilled artisan would be aware of the Swatloski *et al.* disclosure as noted above (e.g., regenerated cellulose; no exemplified reaction), and the present rejection does not account for such problems.

Furthermore, it is still not clear as to how the Examiner can take the esterification reactions of Nobuo *et al.* and Swatloski *et al.*, and convert such reactions into an etherification one as taught in Brandt (*Ullmann's Encyclopedia*). Applicants heavily traverse such an assertion, and the Examiner is using improper hindsight reconstruction to make the instant rejection. Applicants note that it is well established that focusing on individual elements of the claimed invention, rather than on the invention as a whole, is not the proper test under 35 U.S.C. § 103(a). Further, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem(s) it solves. *In re Wright*, 6 USPQ2d 1959, 1962 (Fed. Cir. 1988) ("The problem solved by the invention is always relevant. The entirety of a claimed invention, including the combination viewed as a whole, the elements thereof, and the properties and purpose of the invention, must be considered"); *In re Sponnoble*, 160 USPQ 237 (CCPA 1969).

With regard to the cited Brandt (*Ullmann's Encyclopedia*) reference, this reference discloses etherifying cellulose in aqueous alkaline solutions using an excess of a base resulting in cellulose chain degradation. This is yet another inconsistency with the present invention. Thus, Brandt (*Ullmann's Encyclopedia*) states in the sentence bridging pages 462-463: "Etherification of cellulose proceeds under alkaline conditions; generally sodium hydroxide (NaOH) is used. Cellulose is first treated with aqueous caustic to yield swollen alkali cellulose, which is then etherified with the reagent." Further, on page 467, left column, lines 25-28, Brandt (*Ullmann's Encyclopedia*) describes: "About 5-20 mol of water per mole of anhydroglucose is needed to achieve sufficient swelling and good accessibility of the activated alkali cellulose." On the contrary, the process of the present invention as instantly recited in claim 1 is carried out in the substantial absence of water, and additionally the process of the present invention can be carried out without unnecessary excess of a base (see page 8, lines 22-24). As the M.P.E.P. directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. *See* MPEP § 2143.03.

Thus, reconsideration and withdrawal of this rejection are respectfully requested.

Other Distinctions

In response to the Examiner's assertion that Applicants are arguing the references "individually" with the citation of *In re Keller* (Office Action at page 4), Applicants respectfully traverse. In the previous Amendment, Applicants have to discuss the deficiencies or problems with the references first before addressing the improper combination of those same references. How else can Applicants discuss the problems of the references? Applicants are traversing that

the skilled artisan would not even combine the cited references in an attempt to achieve what is being claimed. Thus, Applicants respectfully request reconsideration of their previous remarks, as well as the remarks in the present reply, because it appears that Applicants' remarks have not been considered in the context of satisfying all requirements for a *prima facie* case of obviousness (*i.e.*, the requisite rationale under *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007)). If anything, the references have been considered and combined individually because, e.g., one of ordinary skill in the art would understand that the Nobuo *et al.* reference is directed to esterification (not etherification) and does not disclose cellulose, microwave irradiation and the modification of cellulose.

Regarding the conclusion at page 4, lines 4-10, pages 5, lines 1-2 and page 5, lines 9-10 of the Office Action, Applicants note *Ex parte Gerlach*, 212 USPQ 471 (BPAI 1980): "Thus, the examiner equates that which is within the capabilities of one skilled in the art with obviousness. Such is not the law. There is nothing in the statutes or the case law which makes 'that which is within the capabilities of one skilled in the art' synonymous with obviousness." At best, the Examiner's comments regarding obviousness (e.g., "The skilled artisan *could* have used the guidance provided by . . .") amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at Applicants' invention because he had the necessary skills to carry out the requisite claimed features. This is an inappropriate standard for obviousness.

Accordingly, for the reasons of record and above, reconsideration and withdrawal of this rejection are respectfully requested.

Conclusion

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Eugene T. Perez (Reg. No. 48,501) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____
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